General Conventions Used in the GEOPAK Manual

Throughout the coordinate geometry portion of the manual, several conventions are used to assist the user to understand the inherent flexibility associated with the various command lines.

( )	**Denotes an optional item which may be included in the Command line.**
abcdef	**the underbar represents the required input of a given command. In the cases where the underbar does not underline an entire keyword, only the part not underlined is optional.**
na*, *nb*, *ni	**points to be stored that have not been used before (new)**
pa*, *pb*, *pc	**previously stored points**
angle	**a numerical angle can be given in any one of the following forms:** **degrees minutes seconds** **degrees minutes** **degrees**
P/M angle	**the backsight direction(direction back), plus or minus the given angle. P is clockwise and M is counter-clockwise.**
P/M DEF angle	**the forward direction (direction ahead), plus or minus the given angle. P for clockwise and M is for counter-clockwise**
Offset value	**OFF (P/M) distance. P means to the right in the forward direction as implied by the statement. M is to the left. If the optional (P/M) is not given, PLUS is assumed.**
station	**A plus sign may be used, embedded in the numerical value. If no plus sign is used, the system parameters will be utilized. No spaces are allowed before and after the plus (+) sign.**
DB	**DIRECTION BACK: applies to the back tangent on curves and spirals.**
DA	**DIRECTION AHEAD: applies to the ahead tangent on curves and spirals.**

CC	**CENTER OF CURVE**
Distance	**(DIS) value (P/M/MUL/DIV value2)** **(DIS (FROM) pa TO pb (P/M/MUL/DIV value2)** **(DIS) R curvename**
Direction	**Allowable formats:** • **angle (P/M angle)** • **N/S angle E?W (P/M-)** • **(AZ) angle (P/M-)** • **pa to pb (P/M angle)** • **pa, pb [optional short for pa TO pb]**
Examples:	**120 34 57** **N 44 08 14.3 W P 90** **S 17 50 E M 2 13 25**
Command continuation	**continuation line is not required in GEOPAK for lines up to 256 characters. If the statement is more than 80 characters, keep typing, the line will move to the left as you type to a maximum of 256 characters.** **NOTE that the input file, however, is formatted to 80 characters. If the line is over 256 characters, the minus sign (-) placed at the end of the line will indicate to the software that the rest of the command will be found on the next line. It is not necessary to be in the 256th column, just at the end of the command.** **NOTE any GEOPAK command can be split at any point in the line without splitting the actual words.**
Pa-pi	**a hyphen between two stored points implies reading those points consecutively.**

ALPHANUMERIC POINT NUMBERS

GEOPAK supports alphanumeric point numbers. Alphanumeric point numbers can be utilized in any command where a point number is required. This includes storing points in the locate or intersect commands, and in the profile commands if the point has been previously stored with an elevation.

Alphanumeric point numbers should have an alpha prefix, then a number suffix, rather than a numeric prefix, alpha suffix. For example, 123abc is not acceptable, while abc123 is supported. The number portion must be greater than zero, i.e., abdc0 or abc000 are not supported. Special characters, such as %, *<, #, should also be avoided. Since the hyphen (-) symbol is utilized for point range in several commands, a point number should not use hyphens.

However, the following COGO keywords should not be used as point names if no numeric characters are utilized. For example the word SHIFT is in the list, it means that the words SHIFT, SHUF, SHI, SH, and S cannot be used as point names. However, the words S1, SH1, SHIF1, and SHIFT1 can be used as point names.

Be aware that there may be other COGO keywords to avoid!

ALL	**ARC**	**AREA**	**ASEC**
AZIMUTH	**BEARING**	**CC**	**CC1**
CC2	**CELL**	**CHAIN**	**CHORD**
CON	**COPY**	**CS**	**CURVE**
DEFLECTION	**DEGREE**	**DELETE**	**DELTA**
DA	**DB**	**DI**	**D2**
ELEVATION	**EQUATE**	**EX**	**FIX**
FROM	**GAP**	**LC**	**LENGTH**
LINE	**LIST**	**LOCATE**	**LS**
LT	**NEAR**	**M**	**OFFSET**
ON	**PARCEL**	**PC**	**PI**
PIS	**PISCS**	**PIZ**	**POINT**
PRINT	**PROJECT**	**PROFILE**	**PT**
RADIUS	**REDEFINE**	**RT**	**SC**
SCS	**SEGMENT**	**SEST**	**SHIFT**
SHOW	**SPIRAL**	**ST**	**STATION**
STORE	**SYSTEM**	**TANGENT**	**THRU**
TL	**TO**	**TRANSPORT**	**TS**

NOTE: The software was developed utilizing the EFB point naming convention. I.e. alphabetic prefix + numeric suffix. In that case, only the keywords that should be used are CC1, CC2, D1, AND D2.

When utilizing alphanumeric point numbers within the store point key-in command, the keyword POINT must be included. For example, when storing point SH3, the command syntax is :

S POI SH3 X 12345 Y 12345

NOTE that when strictly point numbers are utilized, the keyword point is not required.

S 3 X 12345 Y 12345

Part 1- Points

a. **Store point**
b. **Print point**
c. **Delete point**
d. **List point**
e. **Equate point**
f. **Locate point**

Part 2- Simple Curves

Part 3- Spirals

Part 4- Chains

STORING POINTS

FORMAT A IS THE PREFERRED METHOD FOR ROADWAY DESIGN

Format A

[1] Store (POInt) number [2] North northing East easting
[3] (STAtion station) [4] (ELEvation elevation) [5] (FEAture feature)
[6] (DEScription description)

[1] The "number" is the alphanumeric identification for the point to be stored. The POI is only required if the point is designated with an alpha character instead of a number.
[2] the northing and easting represent the point coordinate location, with N and E prefixing the coordinates.
[3] The point can be assigned a station
[4] Elevation if it is required.
[5] Feature (i.e. CB, DI, MH, Tree, etc.)
[6] Description (i.e. PI of curve RMP6, however, use of the inch symbol (") is NOT supported.

Example:

Point 117 or A117, is a 48" oak tree located at N 10923.8766 E 51230.9797 with a station of 28+91.44 and an elevation of 137.2'.

STORE 117 NORTH 10923.8766 EAST 51230.9797 STATION 28+91.44 ELEVATION 137.2
OR
S 117 N 10923.8766 E 51230.9797 STA 28+91.44 EL 137.2

STORE POINT A117 NORTH 10923.8766 EAST 51230.9797 STATION 28+91.44
OR
S POI A117 N 10923.8766 E 51230.9797 STA 28+91.44

STORE POINT 117 NORTH 10923.8766 EAST 51230.9797 STATION 28+91.44 FEATURE TREE DESCRIPTION "48 INCH OAK TREE"
OR
S 117 N 10923.8766 E 51230.9797 STA 28+91.44 FEA TREE DES "48 INCH OAK TREE"

Format B

THIS FORMAT REQUIRES GEOPAK COORDINATE USER PREFERENCE DISPLAY SET TO X/Y.

[1] Store (POInt) number [2] X easting Y northing [3] ((STAtion station) [4] (ELEvation elevation) [5] (FEAture feature) [6] (DEScription description)

Example: Y X

Point 117 or A117, is a 48" oak tree located at N 10923.8766 E 51230.9797 with a station of 28+91.44 and an elevation of 137.2'.

S 117 X 51230.9797 Y 10923.8766 STA 28+91.44 EL 137.2
OR
S POI A117 Y 10923.8766 X 51230.9797 STA 28+91.44 EL 137.2

Format C

THIS FORMAT REQUIRES GEOPAK COORDINATE USER PREFERENCE DISPLAY SET TO N/E.

[1] Store (POInt) number [2] northing easting [3] (STAtion station) [4] (ELEvation elevation) [5] (FEAture feature) [6] (DEScription description)

Example:

Point 117 or A117, is a 48" oak tree located at N 10923.8766 E 51230.9797 with a station of 28+91.44 and an elevation of 137.2'.

S 117 10923.8766 51230.9797 STA 28+91.44 EL 137.2
OR
S POI A117 10923.8766 51230.9797 STA 28+91.44 EL 137.2

Format D

THIS FORMAT REQUIRES GEOPAK COORDINATE USER PREFERENCE DISPLAY SET TO X/Y.

[1] Store (POInt) number [2] easting northing [3] (STAtion station)
[4] (ELEvation elevation) [5] (FEAture feature) [6] (DEScription description)

Example: Y X

Point 117 or A117, is a 48" oak tree located at N 10923.8766 E 51230.9797 with a station of 28+91.44 and an elevation of 137.2.

S 117 51230.9797 10923.8766 STA 28+91.44 EL 137.2
OR
S POI A117 51230.9797 10923.8766 STA 28+91.44 EL 137.2

EXERCISE

USE FORMATS A, B, C AND D TO STORE EACH OF THE FOLLOWING POINTS.

Point 112 is located N 186343.6870 E 2329416.6145 with a station of 10+00.00

Point AA2 is a PI for curve 18 located at N 186329.6949 E 2330106.4726

Point 333zzz is a proposed right-of way monument located at N 184990.2510 E 2332774.0729 with a station of 247+000.000 and an elevation of 205.000 m

Point 771 is the corner of a brick house in parcel 45 located at N 185746.4795 E 2340503.2782 with station 158+00.00

Point jjj000 is a 60" pine tree located at N 185489.2395 E 2342643.1720 with a station of 10+00.00

Point PIZ is a light pole located at N 181737.9727 E 2343658.5224 with a station of 21+00.00.

Point SH7 is located N 181138.3111 E 2344748.5640 with an elevation of 128.71'.

Point 8 is a 48" oak tree located at N 280492.2598 E 2345916.7146 with a station of 175+00 .00.

PRINTING DATA FROM STORED POINTS

Where *pa, pb, pc, pk*, etc are the identification number of the stored point.

FORMAT A

PRInt POInts *pa (pb, pc, pk)*

PRI POI 10, 20, 40, 60	**data for points 10, 20, 40, 60**

FORMAT B

PRInt POInts *pa* thru *pk*

PRI POI 10 THRU 50	**data for points 10 thru 50**

FORMAT C

PRInt POInts *pa-pk*

PRI POI 10-60	**data for all points 10-60**

OR

PRInt POInts *

PRI POI *	**data for all points stored in the Gpk file**

DELETING STORED POINTS

FORMAT A

DELete POInts *pa (pb, pc, pk)*

DEL POI 10, 20, 40 and 60	**deletes points 10, 20, 40 and 60**

FORMAT B

DELete POInts *pa* thru *pk*

DEL POI 10 THRU 50 — **deletes points 10 thru 50**

FORMAT C

DELete POInts *pa-pk*

DEL POI 10-60 — **deletes all points 10 thru 60**

DEL POI * — **command** not supported, would delete all points stored in the Gpk file**

**** NOTE: IF YOU COULD USE THIS COMMAND YOU START OVER!!!!**

LIST STORED POINTS

FORMAT A

LISt POInts *pa (pb, pc, pk)*

LIS POI 10, 20, 40 and 60 — **list points 10, 20, 40 and 60**

FORMAT B

LISt POInts *pa* thru *pk*

LIS POI 10 THRU 50 — **list points 10 thru 50**

FORMAT C

LISt POInts ***pa-pk***

LIS POI 10-60 **list all points 10-6**

OR

LISt POInts * **list for all store points**

LIS POI *

OR

LIS POI ABC* **list all point with prefix ABC**

LIS POI *ABC **list all points with suffix ABC**

STORE POINT BY EQUATE

EQuate POINT number TO (PREVIOUSlLY STORED POINT OR INTRINSIC VALUE*)

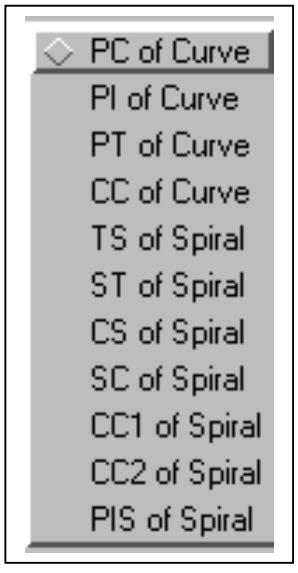
EQ 22 TO 10

OR

EQ 22 TO PC CUR C2

***INTRINSIC VALUE means an unassigned internally computed point inside the .gpk file**

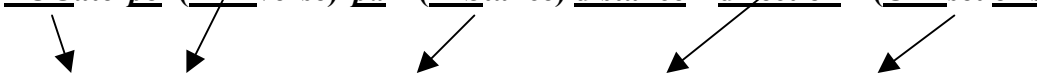
Refer to GEOPAK Manual, Volume I, Chapter 6 page 6-13, for a full list of fields and further details.



LOCATE POINT

FORMAT A

LOCate *pb* (TRAverse) *pa* (DIStance) distance direction (OFFset offset)



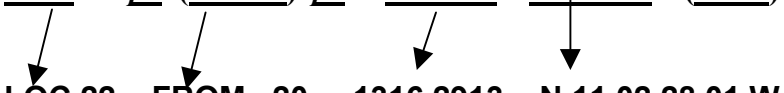
LOC 22 TRA 20 DIS 1316.2913 N 11 02 28.01 W OFF M 20.5

OR

LOC 22 20 1316.2913 N 11 02 28.01 W M 20.54

FORMAT B

LOCate *pb* (FROM) *pa* distance direction (offset)



LOC 22 FROM 20 1316.2913 N 11 02 28.01 W

OR

LOC 22 20 1316.2913 N 11 02 28.01 W

EXERCISE:

USE FORMATS A AND B TO STORE EACH OF THE FOLLOWING POINTS.

Point 10 is located N 481208.1307 E 687892.7730 with a station of 10+00.00

Point 20 is located 1293.2114' from 10 with a bearing of N 16 52 32.01 E

Point 30 is located 1964.4258' from 20 with a bearing of N 11 02 28.01 W

Point 40 is located S 04 34 00.00 W at a distance of 2394.32' from 30

The coordinates for point 50 are N 488831.2969 E 686484.7546. Locate point 70 from 50 using a distance of 2401.77' and a bearing of N 30 26 00.00 W.

Using a distance of 1185.389m and a bearing of S 39 04 29.99 E locate point 60 from point 10.

Point 11 is offset 7 feet to the left of point 10
(Note: pa to pb supports a distance and/or bearing value)

WRITE THE COMMANDS TO:

Equate point 100 to any one of the previously stored points (your choice)

Equate point 101 to the PT of curve 75

List all stored points

List all points stored with the prefix ZZZ

List all points stored with the suffix RRR

Print the data for points 20, 100, 11 and 70

Delete points 1-8

Delete all the points in the Gpk file.

FOR ADDITIONAL INFORMATION on STORE and LOCATE refer to the GEOPAK manual, Part II Coordinate Geometry, Chapter 6, Point Commands and Chapter 12, Locate Commands